Homework?
Doppler
Speed of sound lab
p433
Q114

$$L = \frac{\lambda}{4}$$

$$c = \lambda f$$

$$c = 4Lf$$

$$c = 4(0.50\,m)(170\,Hz)$$

$$c = 340\,m/s$$

Q103 $T = 0.99\,s$

$$f = \frac{1}{T} = \frac{1}{0.99\,s} = 1.01\,Hz$$

Q15

2x mass

$$F_g = mgh$$

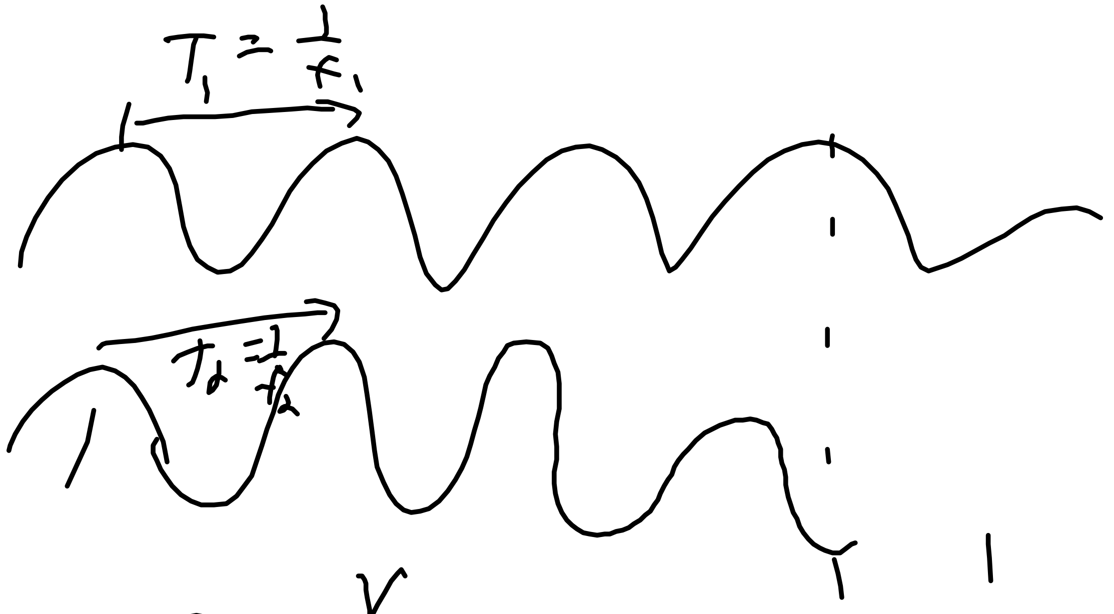
Q111

$L = \frac{\lambda}{2}$ and $2 \times h$

$\lambda_{string} = 66\,cm$ in string

$V_{s\,air} = 340\,m/s = \lambda (246\,Hz)$

$\lambda_{air} = 1.4\,m$



$\lambda = \frac{v}{f}$

$\lambda_2 - \lambda_1 = N \lambda_2$

$\frac{v}{f_r} - \frac{v}{f_1} = \frac{v}{f_2}$

http://www.walter-

fendt.de/ph6en/beats_en.htm

Doppler Effect

The apparent change in frequency of a wave due to the relative motion between the source and the observer(Sheldon Cooper)
https://www.youtube.com/watch?v=Tn35SB1_NYI
Car horn
https://www.youtube.com/watch?v=a3RfULw7aAY&feature=related

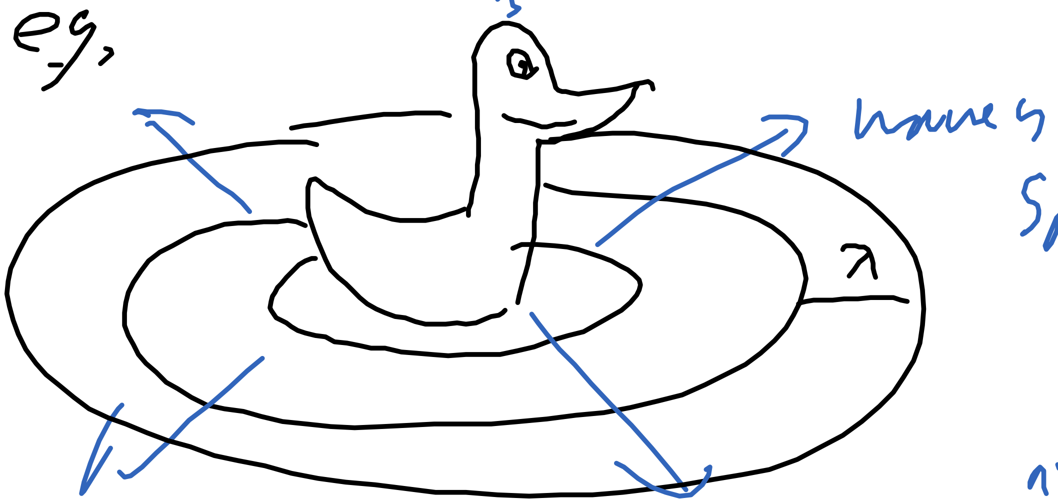
Neeeeeeyowwww

higher frequency approaching

lower frequency retreating

$V_s = 0$ source of waves

eg,



Spread out in a circle at velocity V_w

at velocity V_w

$$\lambda' = \lambda \pm V_s T$$

$$\frac{V_w}{f'} = \frac{V_w}{f} \pm \frac{V_s}{f}$$

$$\frac{V_w}{f'} = \frac{V_w \pm V_s}{f}$$

$$f' = f\left(\frac{V_w}{V_w \pm V_s}\right)$$ moving source

$$f' = f\left(\frac{V_w \pm V_o}{V_w}\right)$$ moving observer at velocity

(v_m) ... at velocity v_o

reflected waves act as __both__ moving source and moving observer.

eg. The Doppler effect was first tested by having two trumpets play the same note, 440.0Hz, one on a train moving away. If you hear 3.0Hz beat frequency, what is the speed of the train?
p434 Q 123, 127, 130

in groups of 3, record the frequency of a tuning fork and the first 2 resonant lengths in the glass tubes. Calculate the speed of sound in the room. (show your work)